44. (Amended) The process of claim 43, wherein the aramid fiber is aramid fiber pulp.

45. (Amended) The process of claim 41, further comprising placing the geotextile fabric on top of an object to be lined.

REMARKS

Presently, Claims 1-46 are pending in this application. Attached hereto is a marked-up version of the changes made to the claims by the current amendment, along with all of the pending claims. Support for the amendments can be found throughout the specification. The attached page is captioned "Version with markings to show changes made along with all pending claims."

Accordingly, the claims contain no new matter. Applicant hereby requests reconsideration of the application, in view of the foregoing amendments.

I. The Rejections Under 35 U.S.C. §112, Second Paragraph

Claims 1-36, 38-40, and 42-45 were rejected under 35 U.S.C. § 112, second paragraph. Applicants have amended the recitations and believe the rejections have been rendered moot. Accordingly, Applicant respectfully requests the PTO withdraw its rejection of the claims under 35 U.S.C. § 112, paragraph two.

II. The Rejections Under 35 U.S.C. §112, First Paragraph

Claims 15-17 and 37-46 were rejected under 35 U.S.C. § 112, first paragraph. The Examiner found the phrase "porous geotextile fabric" was not adequately described in the specification. Porous geotextile fabric is known in the art. It is a geotextile fabric containing pores.

The Action also rejected Claims 15-17 under 35 U.S.C. § 112, first paragraph. The Examiner found the phrase "restriction free check valves" was not adequately described in the specification nor were check valves, by their nature, capable of being restriction free. Applicants have amended Claim 15 to delete the phrase "restriction free". Accordingly, Applicant respectfully requests the PTO withdraw its rejection of the claims under 35 U.S.C. § 112, first paragraph.

III. CLAIMS 1-3, 5, 8, 10-12, 14, 34 AND 35 ARE NOVEL AND ARE NOT ANTICIPATED BY KOTSCHWAR U.S. PATENT NO. 5,614,575

The rejection of Claims 1-3, 5, 8, 10-12, 14, 34 and 35 under 35 U.S.C. §102(b), as being anticipated by the Kotschwar reference (U.S. Patent No. 5,614,575) is respectfully traversed.

A. CONCISE EXPLANATION OF THE CLAIMED INVENTION

The present invention is a sprayable polymeric material and the method of making the material. The polymeric material comprises a fibrous material. The polymeric material is also solvent free, containing no volatile organic compounds (VOCs). New methods for greatly reducing or eliminating VOCs during the application of such materials are needed to prevent worker injury and comply with current and

pending environmental regulations. Also, several cost and time saving advantages to the applicator accrue from use of a solventless system as seen in the present invention.

The fibrous material of the present invention is also mixed into the polyol or polyisocyanate compounds prior to their mixing to form a polyurethane. Thus, this provides a greater time for the fibrous material to pre-wet and mix with the individual components, without being concerned about the cure time of the polyurethane. This pre-wetting is also beneficial in that the fibrous material is fully incorporated into the reaction mixture before it thickens after the reaction of the polyol and the polyisocyanate. The full incorporation of the fibrous material insures a stronger final product.

B. THE KOTSCHWAR '575 REFERENCE DOES NOT ENABLE OR TEACH THE CLAIMED INVENTION

The Kotschwar reference ('575) discloses a sprayable polyurethane composition. The polyurethane composition is formed after a component of polyol and a component of polyisocyanate are combined in a spray gun and then a fibrous-reinforcing material is blown into the now formed polyurethane. Once the two reactant components come together they thicken, forming the polyurethane composition, making it impossible to form a thoroughly incorporated fibrous material.

The fibrous material of the present invention is added separately to either the polyol component, the isocyanate component, or both, prior to reacting the reaction components. Therefore, Kotschwar does not anticipate the claimed invention.

Therefore, the Applicant respectfully requests that the PTO withdraw its rejections of Claims under 35 U.S.C. §102(b).

IV. CLAIMS 4, 6, 7, 9, 13, 18-33, AND 36 ARE NONOBVIOUS OVER THE KOTSCHWAR '575 PATENT IN VIEW OF COTTS ET AL., (U.S. Patent No. 4,857,569)

Claims 4, 6, 7, 9, 13, 18-33, and 36 have been rejected under 35 U.S.C. 103(a) as being unpatenable over Kotschwar ('575) in view of Cotts et al., (U.S. Patent No. 4,857,569). The Examiner has asserted that Kotschwar failed to teach such features as "the reduced quantity of fiber, the prewetting of fibers, the use of a 1:1 volumetric ratio, the coating of an existing reinforcement structure with a foamed reinforced composition, and the subsequent coating with a non-foamed fiber reinforced composition. However, the Examiner stated it would have been obvious to one skilled in the art to arrive at those features. However, in determining the differences between the prior art and the present claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 218 U.S.P.Q. 871 (Fed. Cir. 1983); Schenck v. Nortron Corp., 713 F.2d 782, 218 U.S.P.Q. 698 (Fed. Cir. 1983).

The Examiner has also asserted that Cotts et al teach that the use of KEVLAR as a reinforcing fiber. The Applicant respectfully traverses this rejection.

B. The Kotschwar '575 reference does not enable or teach the claimed inv ntion

Applicants incorporate the comments made in Section III.B. above. Furthermore, Kotschwar does not teach or suggest the use of a polyurethane composition containing no VOCs. In fact Kotschwar teaches away from the present invention by stating it is preferable that the "two components are combined while spraying them individually into a mold along with a fibrous material." In contrast, the application teaches that the fibrous material is added to either component separately or both components, prior to the components being combined.

C. The Cotts et al '569 reference does not enable or teach the claimed invention

The Cotts et al., reference (U.S. Patent No. 4,857,569) merely discloses the use of KEVLAR in a polyurethane. Again, Cotts teaches the addition of rod-like polyamide to an already formed polyurethane, see Example 4, column 1. Therefore, Cotts et al does not teach nor render obvious the claimed invention.

Accordingly, one of ordinary skill in the art would not be motivated to combine the teachings of Kotschwar with the teachings of Cotts et al., to arrive at the present invention. Thus, it is respectfully submitted the instant invention is clearly not obvious to one of skill in the art and the Applicant respectfully requests that the PTO withdraw its rejection under 35 U.S.C. § 103(a).

V. CONCLUSION

Applicant respectfully requests entry of the foregoing and remarks in the file history of the instant application. The claims are believed to be in condition for

allowance, and reconsideration and withdrawal of all the outstanding rejections is therefore believed in order. Should the Examiner have any questions, the Examiner is encouraged to telephone the undersigned.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE ALONG WITH ALL PENDING CLAIMS

1. (Amended) The process for the preparation of a sprayable polymeric material having a fibrous material, comprising:

a) providing a [predetermined amount of] fibrous material;

b) providing reaction components comprising a predetermined amount of polyol and a[n] predetermined amount of isocyanate;

c) heating the reaction components;

d) adding the fibrous material to the polyol component, the isocyanate component, or both; and

e) reacting the reaction components, whereby to create the polymeric material having no volatile organic compounds.

2. The process of claim 1 further comprising heating the fibrous material to a temperature from about 140 F to 160 F, prior to adding the fibrous material to the reaction components.

3. (Amended) The process of claim 1 wherein the fibrous material is [substantially] dry.

4. (Amended) The process of claim 1, further comprising, prior to adding the fibrous material, pre-wetting the fibrous material to (i) about 10% by volume of the

predetermined amount of polyol component, (ii) about 10% by volume of the predetermined amount of isocyanate component, or (iii) about 10% of the predetermined amount of both components combined.

5. (Amended) The process of claim 1 wherein the fibrous material is an aramid, [high molecular weight] polyethylene, fullerene, nanotube, ceramic fiber, or mixtures thereof.

6. (Amended) The process of claim 5, wherein the aramid fiber is [KEVLAR] aramid fiber pulp.

7. (Amended) The process of claim 1, wherein the [predetermined amount of] fibrous material is from about 0.5 weight % to 1.0 weight percent of the total weight of the composition.

8. The process of claim 1 wherein the heating of the reaction components is from about 160 F to 250 F.

9. The process of claim 1, wherein the polyol component and the isocyanate component are provided in a 1:1 ratio by volume.

10. The process of claim 1, further comprising adding water to the polymeric material, whereby to create a matrix of closed cell polyurethane.

11. (Amended) The process of claim 10, further comprising molding the [adding pressure to] closed cell polyurethane, wherein the molding is either in normal atmospheric conditions or under 2-3 atm of pressure.

12. The process of claim 1, wherein the adding of the fibrous material to the polyol, the isocyanate, or both, is by mixing, whereby to randomly locate the fibrous material within the polyol, the isocyanate, or both.

13. (Amended) A process for the preparation of a composite of a sprayable polymer resin having a reinforcing fiber, comprising adding the reinforcing fiber to a first polymeric reactant material solution and to a second polymeric reactant material solution, reacting the first and second solutions, whereby the reinforcing material is incorporated homogeneously without causing separation during the curing reaction between the first and second polymeric reactant material solutions.

14. (Amended) The process for the preparation of a sprayable polymeric material having a fibrous material, comprising:

a) providing a [predetermined amount of] fibrous material;

b) providing a[t least two] first and second reaction component[s], wherein the first and second reaction components contains no volatile organic compounds and [are] react to form a polyurethane, polyester, epoxy, or polyurea;

c) heating the reaction components;

d) adding the fibrous material to: the first reaction [polyol] component, wherein the first reaction component is polyol; the second reaction [isocyanate] component, wherein the second reaction component is isocyanate; or both the first and second reaction component; and

e) reacting the first and second reaction components, whereby to create the polymeric material.

15. (Amended) A [restriction free] spray nozzle for mixing and spraying a first [reactive] polymeric reactant material with a second [reactive] polymeric reactant material, at least one of the [reactive] reactant polymeric materials containing a fibrous material, forming a two part polymer comprising: a [restriction free] check valve without springs, a hose for conveying said first and second polymeric materials to a ball valve, said nozzle spraying a mixture of the first and second materials from said check valve onto a surface.

16. (Amended) The spray nozzle of claim 15 wherein the fibrous material is an aramid, [high molecular weight] polyethylene, fullerene, nanotube, ceramic fiber, or mixtures thereof.

17. (Amended) The spray nozzle of claim 16, wherein the aramid fiber is [KEVLAR] aramid fiber pulp.

18. A reinforced structure comprising a first and second layer of polyurethane resin containing from about 0.5 to 1.0% by weight of a fibrous material sandwiching a layer of polyurethane foam containing from about 0.5 to 1.0% by weight of a fibrous material.

19. (Amended) The reinforced structure of claim 18, wherein the fibrous material is an aramid, [high molecular weight] polyethylene, fullerene, nanotube, ceramic fiber, or mixtures thereof.

20. (Amended) The reinforced structure of claim 19 wherein the aramid fiber is [Kevlar] aramid fiber pulp.

21. (Amended) The reinforced structure of claim 18 wherein the thickness of the first and second layers of polyurethane resin are about 100 mils.

22. (Amended) The reinforced structure of claim 18 further comprising a panel between said first or second layer of polyurethane [foam] resin [and a second layer of polyurethane foam].

23. (Amended) A method of coating a reinforcement structure having a top and a bottom side with a polyurethane composition comprising:

a) providing a [predetermined amount of] fibrous material;

b) providing reaction components comprising a polyol and an isocyanate;

c) heating the reaction components;

d) mixing the fibrous material with the polyol, the isocyanate, or both;

e) reacting the reaction components, whereby to create a polymeric resin;

f) spraying the top of the reinforcement structure with a polymeric foam containing a second fibrous material; and

g) spraying the polymeric foam, on top of the reinforcement structure, with the polymeric resin, prior to cure of the polymeric resin.

24. The method of claim 23, further comprising spraying the bottom side of the reinforcement structure with the polymeric foam.

25. (Amended) The method of claim 24, further comprising spraying the polymeric foam, on the bottom side of the reinforcement structure, with the polymeric resin.

26. The method of claim 23, wherein the step of reacting the reaction components is performed in an inert atmosphere.

27. (Amended) The method of claim 23, wherein the first and second fibrous materials are aramid, [high molecular weigh] polyethylene, carbon, or ceramic fiber, or mixtures thereof.

28. (Amended) The method of claim 27, wherein the aramid fiber is [Kevlar] aramid fiber.

29. (Amended) The method of claim 23, wherein the fibrous material is from about 0.5% to about 1.0% by weight of the [polymeric resin] polyurethane composition.

30. The method of claim 23, wherein the heating is from about 160°F to about 250°F.

31. The method of claim 23, wherein the polyol and the isocyanate are provided in about a 1:1 ratio by volume.

32. The method of claim 23, further comprising applying pressure to the reaction components.

33. (Amended) The method of claim 23 wherein the reinforcement structure is sprayed with a thickness of about 100 mils of the polymeric resin.

34. A sprayable polyurethane composition comprising from about 0.5% to 30% by weight of a fibrous material, wherein the polyurethane is solvent-free and is the reaction product of a polyol and a polyisocyanate.

35. (Amended) The composition of claim 34 wherein the fibrous material is an aramid, [high molecular weight] polyethylene, carbon, or ceramic fiber, or mixtures thereof.

36. (Amended) The composition of claim 35 wherein the aramid fiber is [Kevlar] aramid fiber pulp.

37. A flexible liner comprising:

a) a porous geotextile fabric;

b) a polyurethane composition comprising a fibrous material sprayed over said porous geotextile fabric, whereby to form a monolithic membrane with the geotextile fabric.

38. (Amended) The flexible liner of claim 37, wherein the thickness of the polyurethane is sprayed at about 100 mils.

39. (Amended) The flexible liner of claim 37, wherein the fibrous material is an aramid, [high molecular weight] polyethylene, carbon, or ceramic fiber, or mixtures thereof.

40. (Amended) The flexible liner of claim 37, wherein the aramid fiber is [Kevlar] aramid fiber pulp.

41. A process for the preparation of a flexible liner comprising:

a) providing a sheet of a porous geotextile fabric having a perimeter edge;

b) spraying a polyurethane composition comprising a fibrous material onto said porous geotextile fabric, whereby to form a monolithic membrane with the geotextile fabric.

42. (Amended) The process of claim 41, wherein the spraying of the polyurethane is a thickness of about 100 mils.

43. (Amended) The process of claim 41, wherein the fibrous material is an aramid, [high molecular weight] polyethylene, carbon, or ceramic fiber, or mixtures thereof.

44. (Amended) The process of claim 43, wherein the aramid fiber is [Kevlar] aramid fiber pulp.

45. (Amended) The process of claim 41, further comprising placing the geotextile fabric on top of [providing] an object to be lined.

46. The process of claim 45, further comprising attaching the geotextile fabric to the object with an adhesive, prior to spraying the polyurethane composition, wherein the perimeter edge of the geotextile fabric is not tacked to the object to allow gas to escape.